

ABSTRACT OF THE DISCLOSURE

A system and method for enhancing data capacity in optical data communication are described. First data is modulated onto a first optical carrier to occupy a data frequency range. The first optical carrier includes a first side frequency separated from the frequency range of the data band. A first modulated carrier having a first polarization state is output. Second data is modulated onto a second optical carrier signal occupying the same data frequency range. The second optical carrier includes a second side frequency separated from the data frequency range of the data band in a direction opposite from the first side frequency. A second modulated carrier having a first polarization state is output. The polarization state of the second modulated carrier is changed to a second polarization state orthogonal to the first polarization state and the first modulated carrier is combined with the second modulated carrier into a combined carrier. The combined carrier is optically transmitted to a receiver, in which the first data having the first polarization state is extracted from the second data having the second polarization state.

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